

Pain Management

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Physical Medicine & Rehabilitation

**SPECIAL
REPORT**

HEALTH & TECHNOLOGY: WHAT THE FUTURE MEANS FOR YOU

The Next Frontiers

Newsweek

May 19, 2003

newsweek.msnbc.com

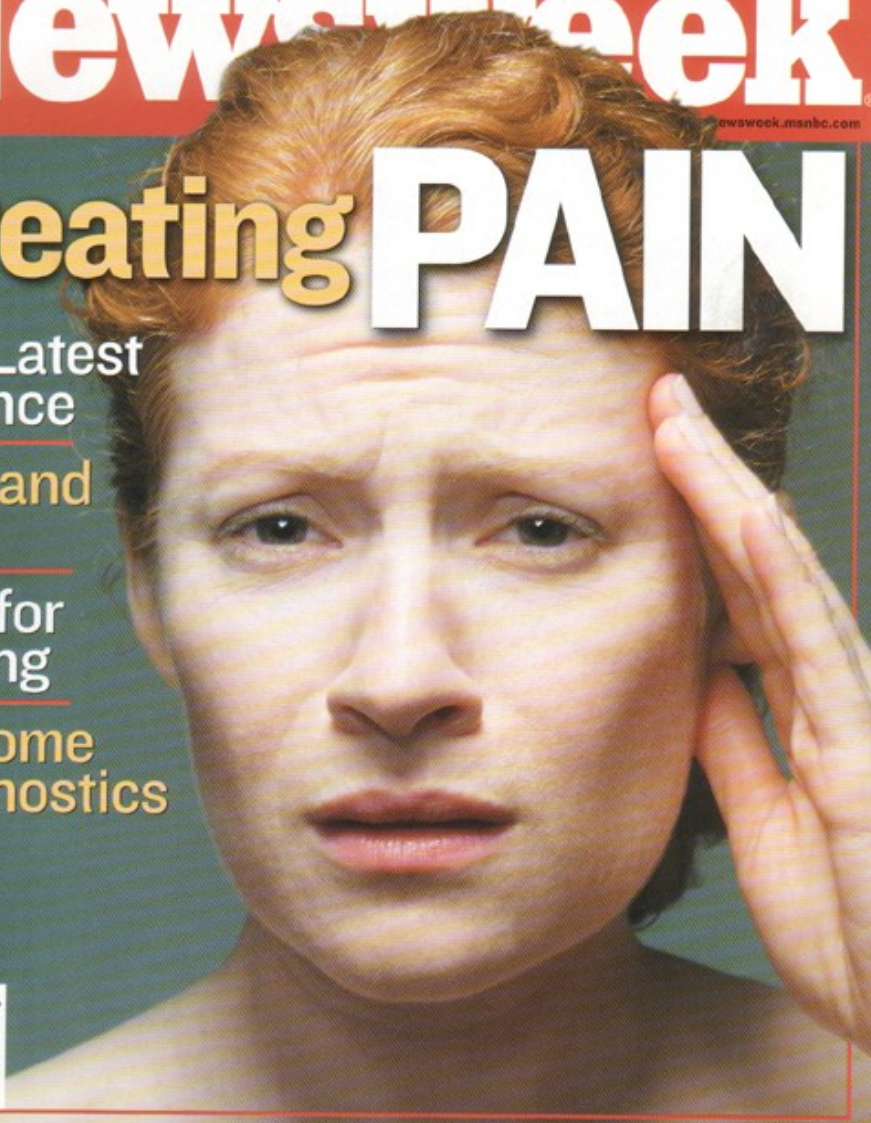
Treating PAIN

The Latest
Science

Kids and
Pain

Tips for
Coping

At-Home
Diagnostics



- **In the United States, 15% to 20% of the population have acute pain, and between 25% and 30% have chronic pain...**

- **Causes more disability than cancer and heart disease combined.**

- **Annual cost, including treatment and lost work days, estimated to be \$100 billion**

New JCAHO Pain Standards

- Patients have a right to pain management.
- All patients are assessed for pain.
- Policies and procedures exist for pain interventions.
- Pain should be controlled as not to interfere with rehabilitation.
- Patients and providers should be educated in pain management.
- Patients discharged from hospital must have their pain needs addressed.
- PI should exist for the organizations pain management.

Introduction

- **Common Definitions**
- **Historical Perspective**
- **Physiology**
- **Patient Evaluation**
- **Common Pain
Conditions**
- **Treatment Options**

Definitions

Acute Pain

- Rapid onset
- Short to moderate duration
- Symptom of some other disease process
- Signal to avoid or modify activity
- Correlates well with degree of tissue injury
- Dissipates with healing

Chronic Pain

- Pain > 3-6 months duration.
- Malignant
- Nonmalignant

“Whereas in acute pain the pain is a symptom of disease or injury, in chronic pain the pain itself is the disease.”

Bonica, John J.

***“Chronic pain is
defined as any consult
which is preceded by
an apology.”***

Definitions

- **Allodynia** - pain arising from a stimulus that does not normally provoke pain
- **Dysasthesia** - an unpleasant abnormal sensation, whether spontaneous or evoked
- **Hyperalgesia** - an increased response to a stimulus that is normally painful
- **Hypoanesthesia** - decreased sensitivity to stimulation
- **Analgesia** - absence of pain in response to stimulation that would normally be painful

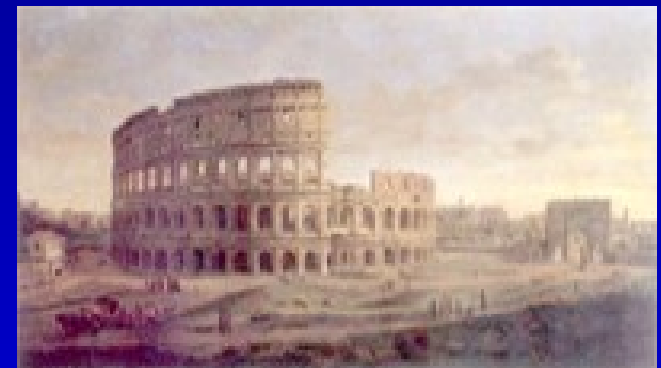
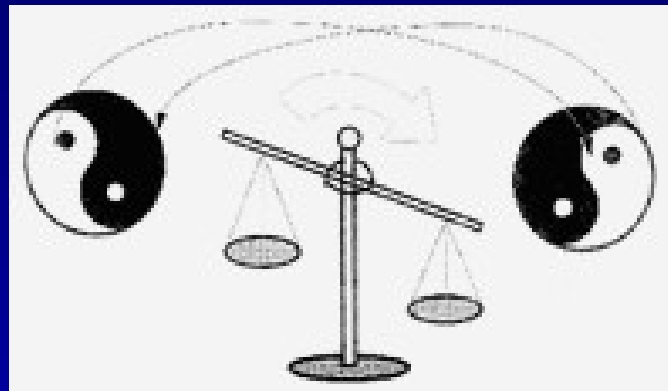
Definitions

- **Hypoalgesia** - diminished pain in response to a normally painful stimulus
- **Hyperpathia** - a painful syndrome characterized by increased reaction to a stimulus, especially a repetitive stimulus, as well as an increased threshold
- **Neuralgia** - pain in the distribution of a nerve or nerves
- **Neuropathy** - a disturbance of function or pathological change in a nerve (mononeuropathy, radiculopathy, plexopathy, polyneuropathy)
- **Deafferentation Pain** - pain resultant from denervation (injury or disease process)

Definitions

- **Tolerance**
- **Dependence**
- **Addiction**
- **Pseudo-Addiction**
- **Diversion**
- **Malignant vs. Nonmalignant Pain**

Historical Perspectives

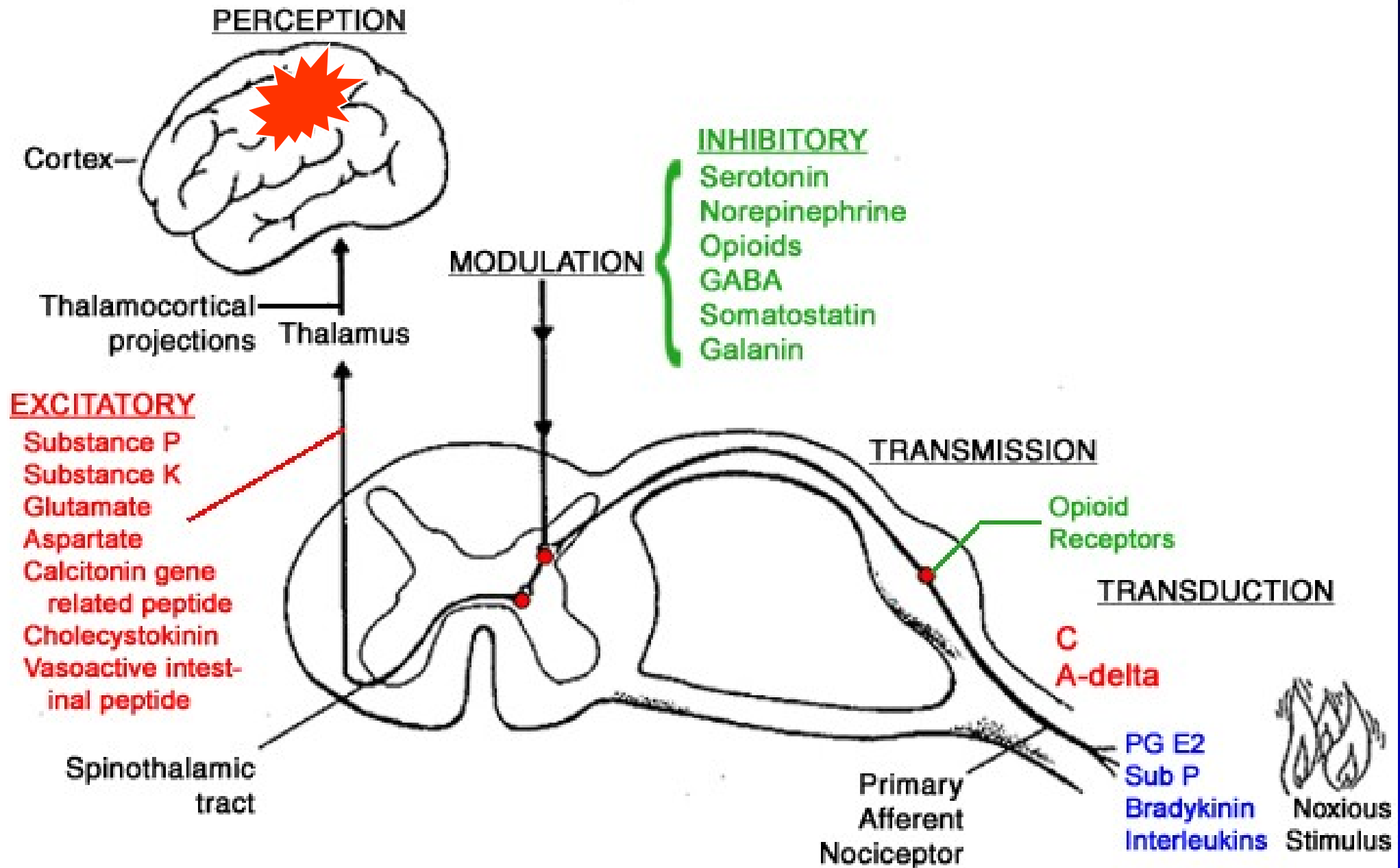


- **Hippocrates:** Balance between four humors (blood, phlegm, yellow bile, and black bile)
- **Plato:** Pain and pleasure are linked together

Pain was not just from peripheral stimulation but an emotional experience

- **Aristotle:** *Sensorium commune – Heart*
- **Leonardo da Vinci:** *Sensorium commune - third ventricle of the brain and the spinal cord is a conductor, transmitting sensations to the brain.*

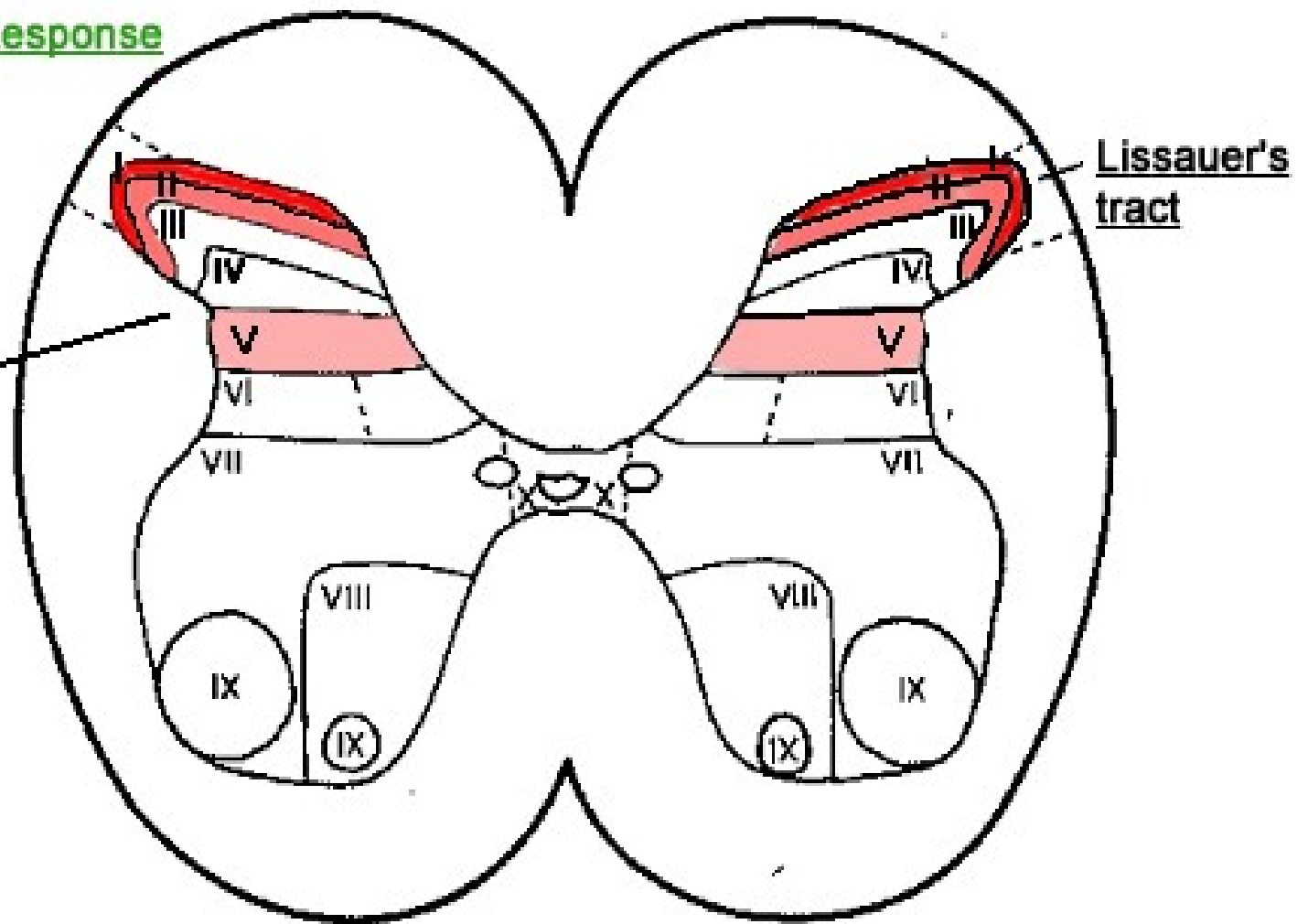




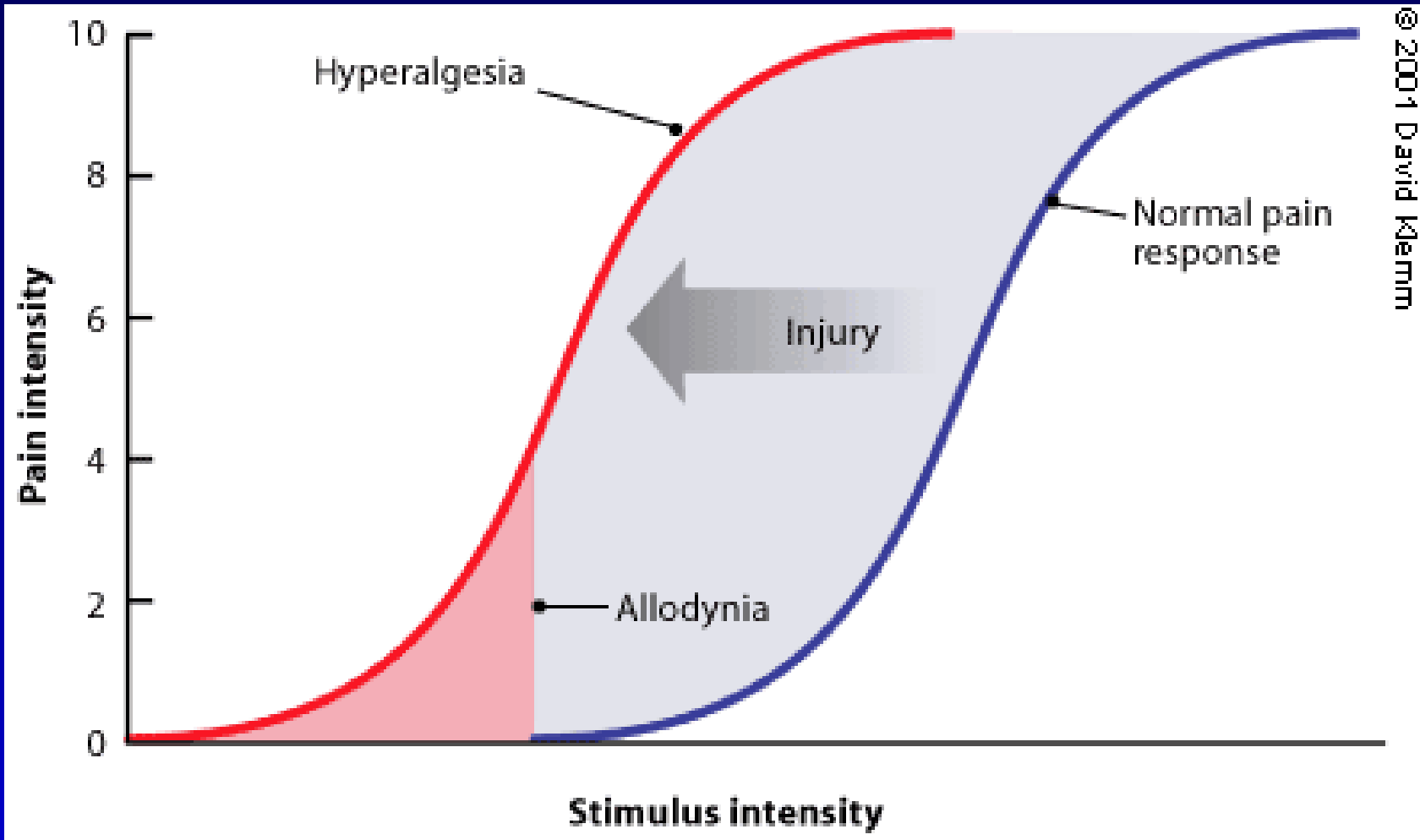
Plasticity of Nociceptor Response

- Regionalization
- Hypersensitivity
- Spontaneous

Wide dynamic range
(WDR)
Nociceptive specific
(NS)



Pain Sensitization from noxious stimuli



JUNE 2, 2003

www.time.com AOL Keyword: TIME

SADDAM'S SONS: EVEN BADDER THAN YOU THOUGHT

TIME

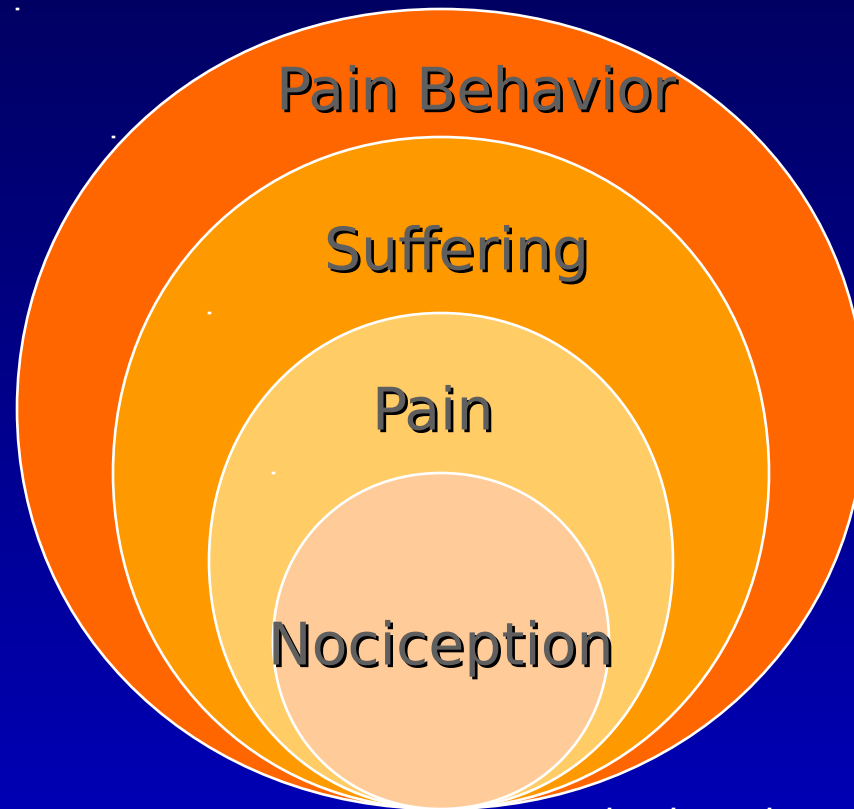
Are you
programmed
from birth, or
does life change
the program?
A radical new
look at ...

**WHAT
MAKES YOU
SPECIAL**

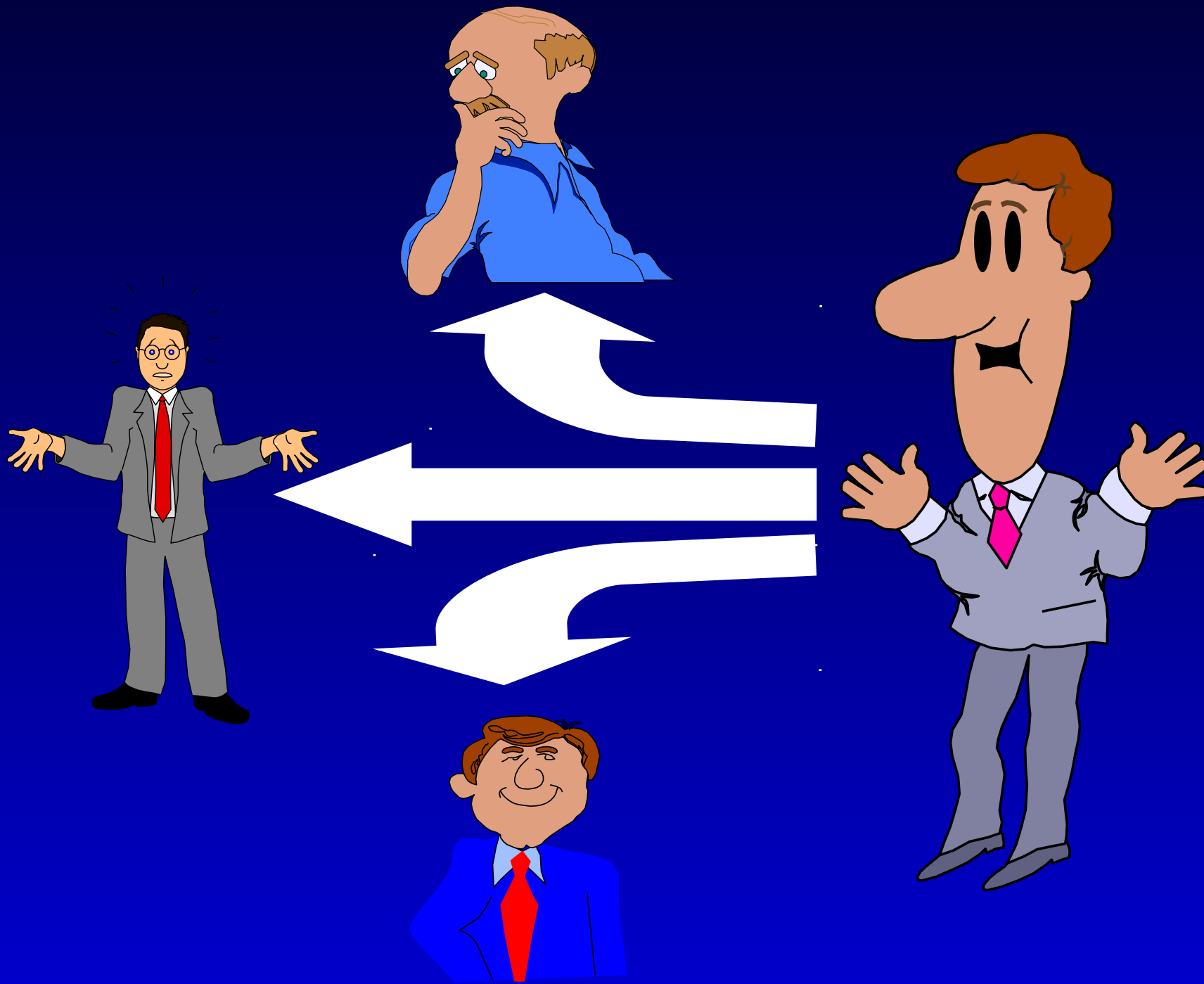
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BETHESDA ,MD 20814-4750

Nature
Vs.
Nurture

Behavioral Pain Syndrome Model



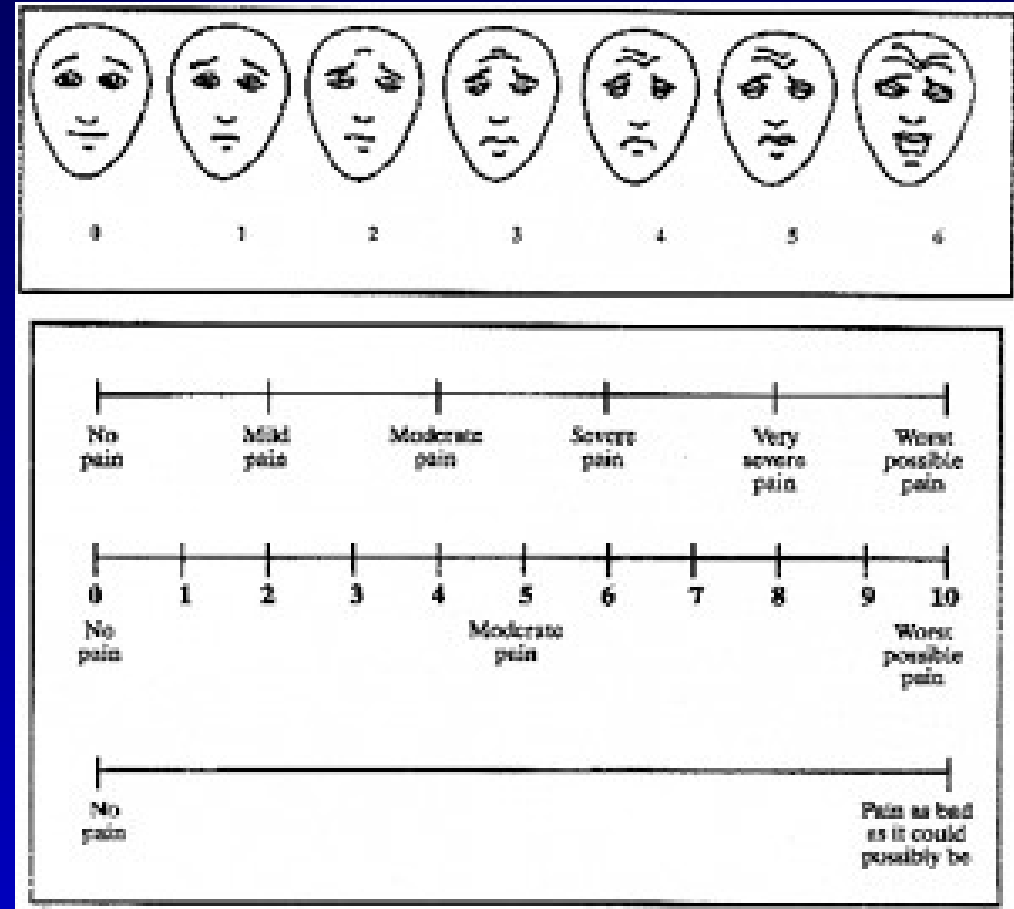
Loeser's Concept of Pain



Patient Evaluation

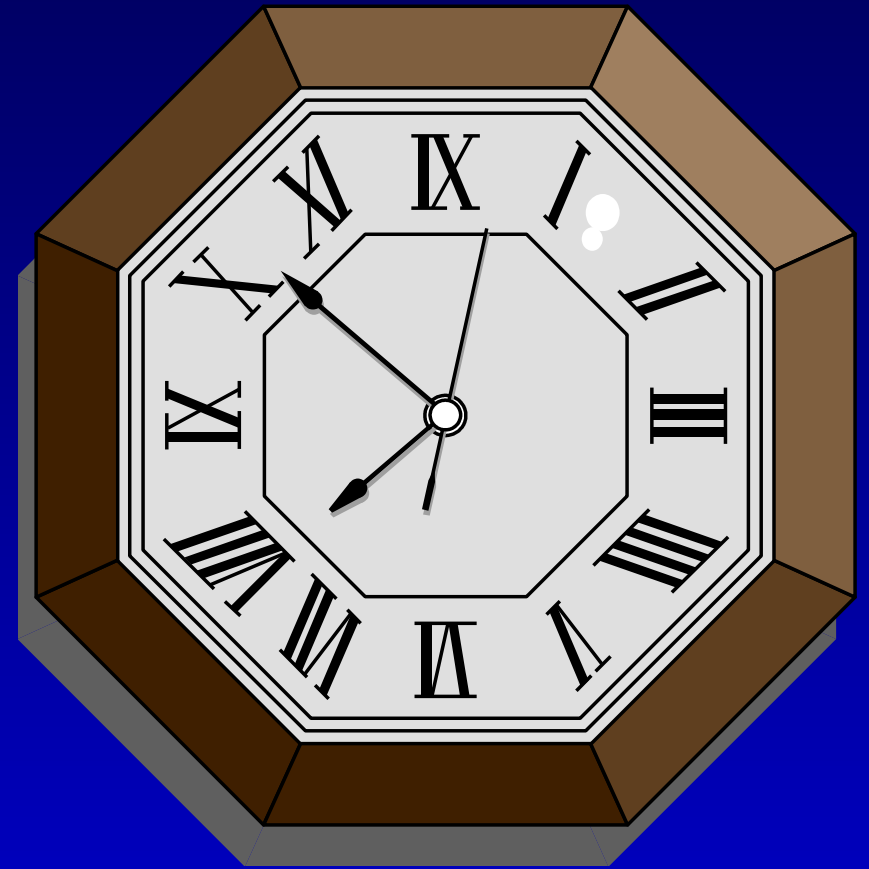
History

- **No biological markers**
 - rely on patient's report
- **Comprehensive**
 - questionnaire
- **Intensity/ Quality**
 - pain scale
- **Modifiers**
- **PMH_x / PSH_x**



History - *Key Points*

- **Treatments tried**
 - therapy
 - modalities
 - medications
 - alternative
- **Sleep disturbance**
- **Functional disturbance**
 - ADL's, work, recreation
- **Psycho-Social stressors**
 - active listening



Date: _____
Name: _____
Social Security # _____

Reason for today's visit _____
My pain today is located: _____
When did pain begin? _____

This pain was caused by: (place an "x" if yes)

<input type="checkbox"/> Military work related injury	<input type="checkbox"/> Non-military related injury
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Is litigation pending for this injury? ☐ Yes ☐ No

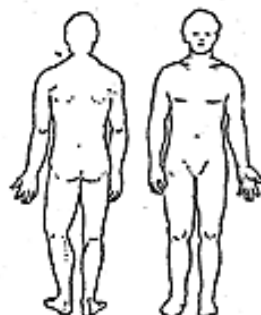
Is your military career dependent upon the resolution of this problem? ☐ Yes ☐ No

What makes this pain worse?

What makes this pain better?

How would you describe this pain?

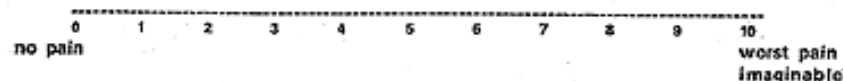
Where is the pain located? (Please mark diagram)



How often do you have this pain? _____ times per day _____ days per week _____ constant
What does this pain prevent you from doing? _____ Please explain: _____

- Performing work functions :
- Performing leisure activities:
- Caring for my family :
- Maintaining personal hygiene :
- Walking :
- Other

Has anything relieved the pain in the past?



Pain level: (please mark the line above to indicate current level of pain)

On a scale, from 0 to 10, what is your average pain over the past 2 weeks? _____
From 0 to 10, what is the worst your pain has ever been? _____ when?

Does the pain affect your sleep? ☐ yes ☐ no

Medications and vitamins / herbs I now take:

name of drug	dosage (mg)	how many tablets?	how often	total # tablets in 1 day?	for how long	does it help?
Past medications						

Previous pain treatments:

Did it help?

Steroid injections	yes	no
TENS unit	yes	no
Physical therapy	yes	no
Biofeedback	yes	no
Pain psychology / counseling	yes	no
Chiropractic	yes	no
Acupuncture	yes	no
Massage	yes	no
Surgery; Explain		

Allergies:

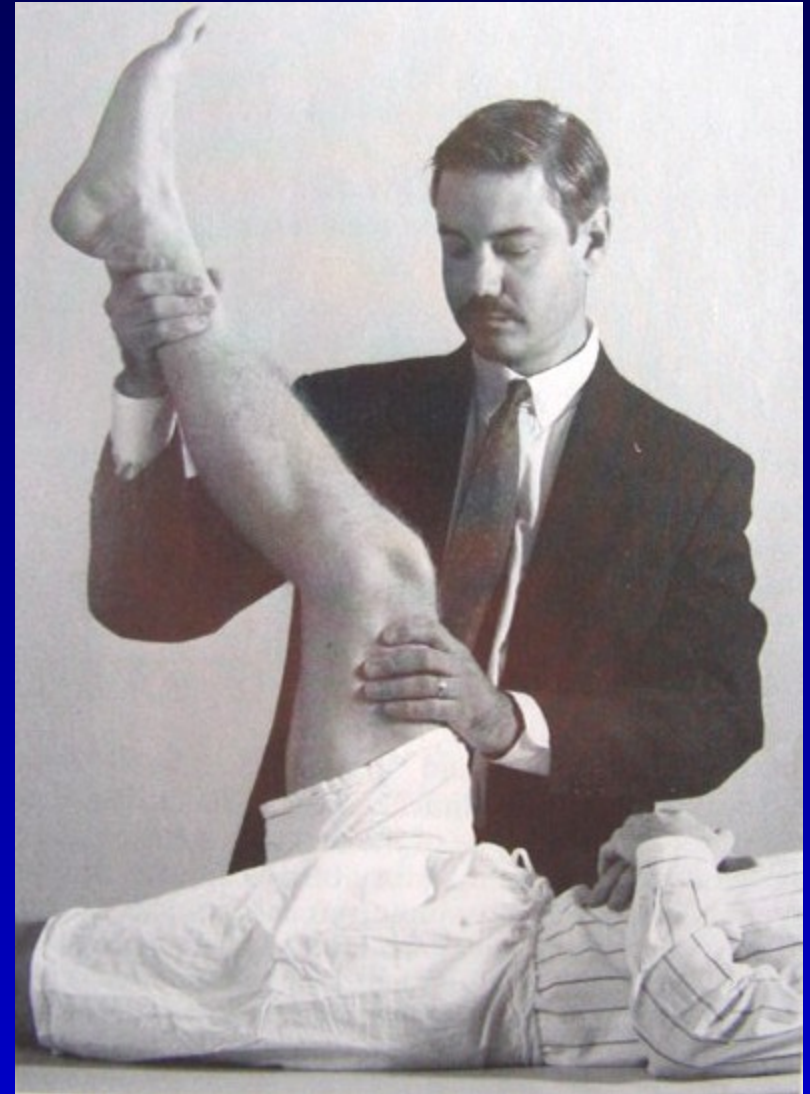
Past Operations:

Other medical conditions:

Is there anything else you feel we should know about concerning your health?

Physical Exam

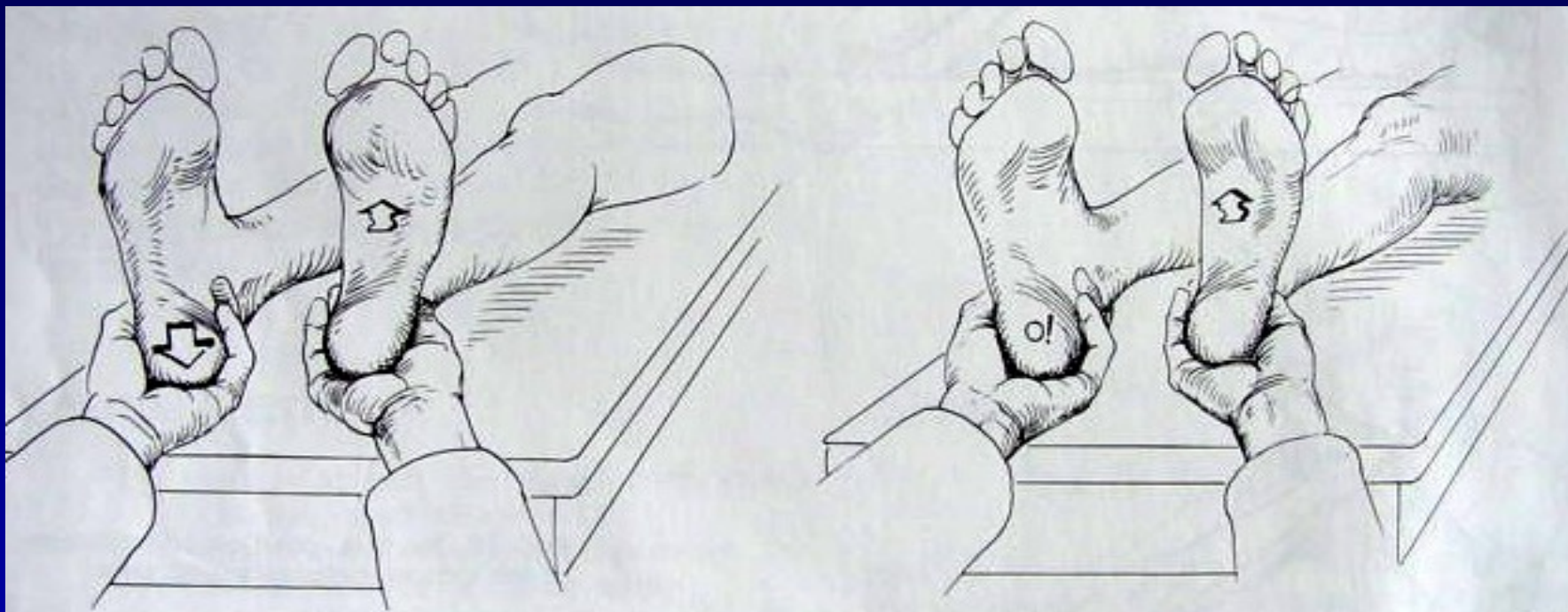
- **Neurologic**
 - mental status/affect
 - numbness/weakness
 - hyperpathia, allodynia
- **Musculoskeletal**
 - Deformities / atrophy
 - Inflammation
 - Tender / trigger points
 - Imbalances
- **Gait & Function**



Waddell's Signs

**R
O
S
T
D**

- Regionalization
- Overreaction
- Simulation
- Tenderness
- Distraction



Hoover's Test

X-rays & Labs

- **Try to find underlying cause**
- **Keep a broad differential dx**
 - cancer (mets or visceral)
(bone scan, MRI, CT)
 - infection / inflammation
(ESR, ANA, RF, HLA-B27, HIV)
 - endocrine
- **Meet patient's expectations**
- **Alleviate patient's fears**

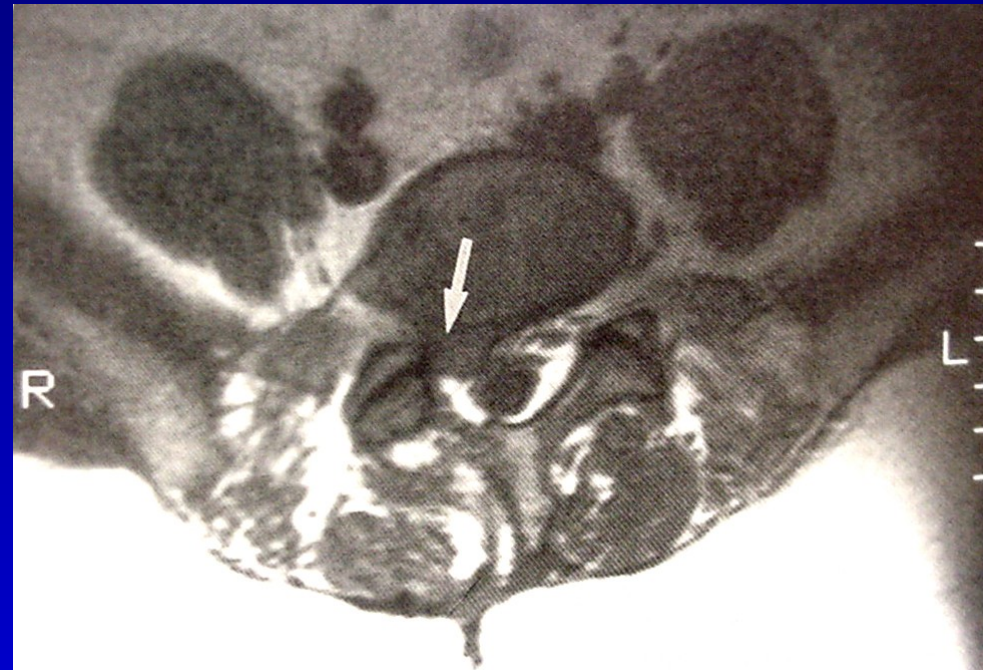
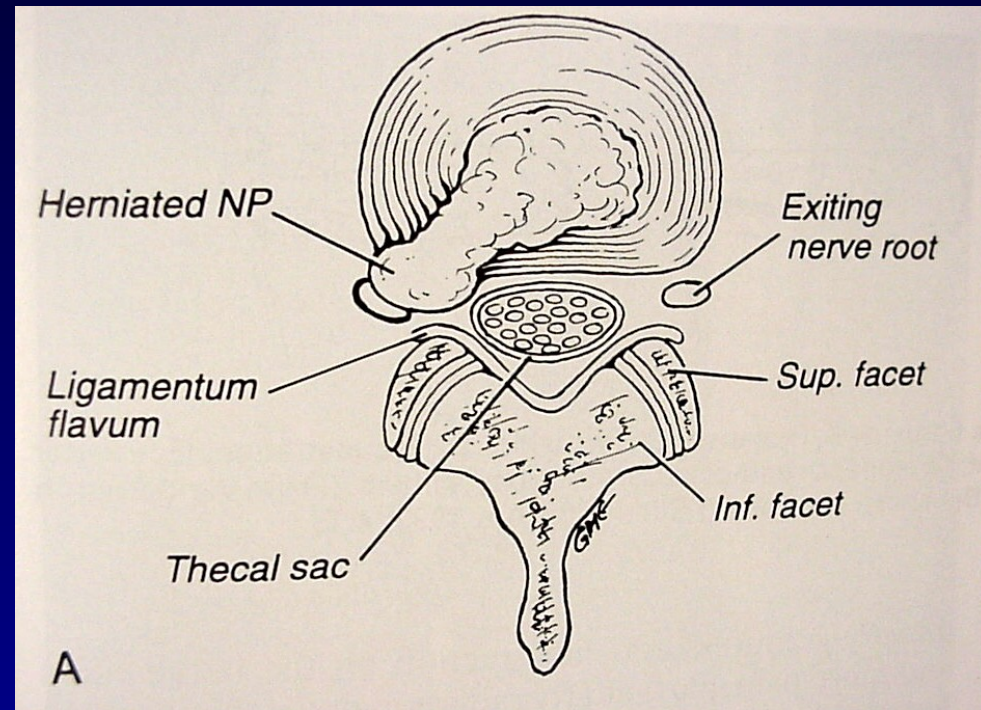


Common Pain Conditions

- Cancer
- Arthritis
- Headaches
- Back & Neck
- Shoulder & Knee
- Neuropathies
 - focal & polyneuropathy
- Factitious
 - secondary gain
- Polymyalgia Rheumatica
- Fibromyalgia
- Myofascial Pain Syndrome
- Complex Regional Pain (RSD)
- Post-Herpetic Neuralgia
- Phantom Limb Pain
- Pelvic Pain
- Psychogenic
 - somatization, hysterical, conversion

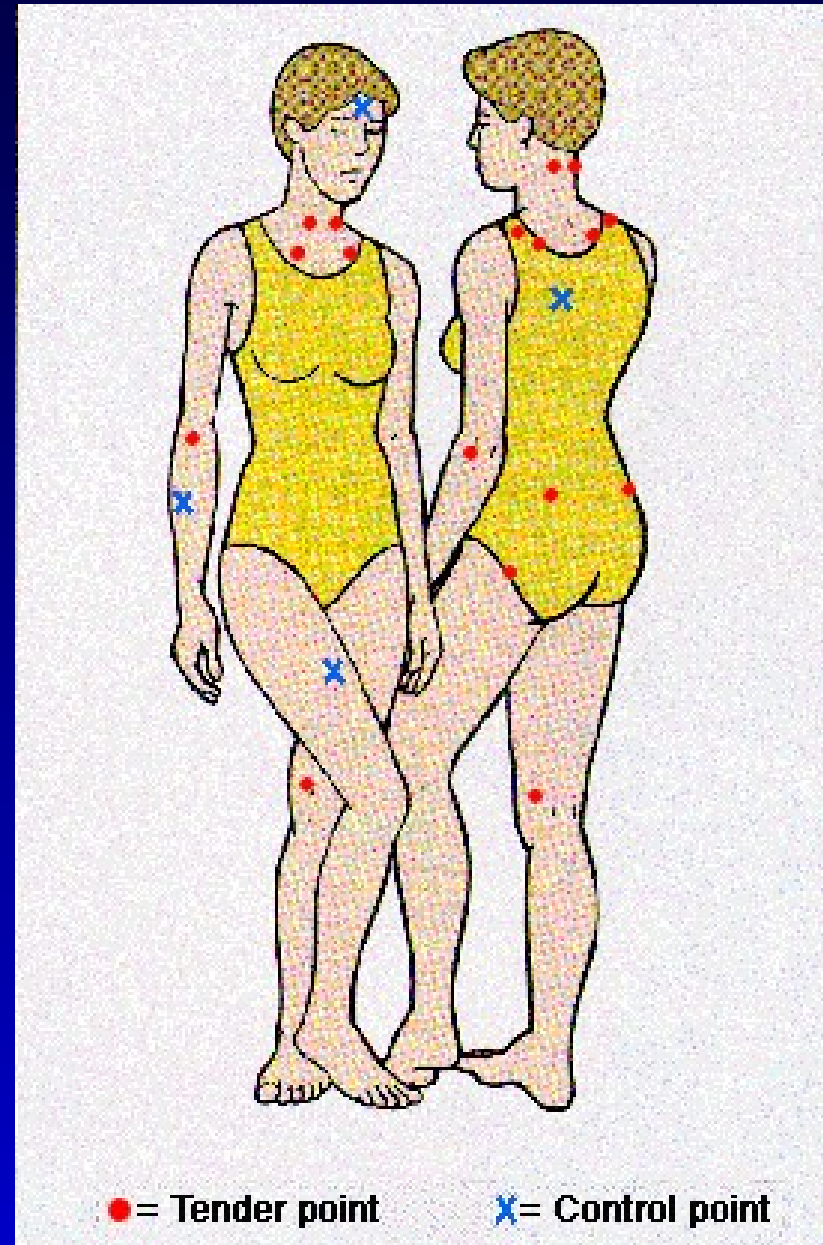
Back Pain

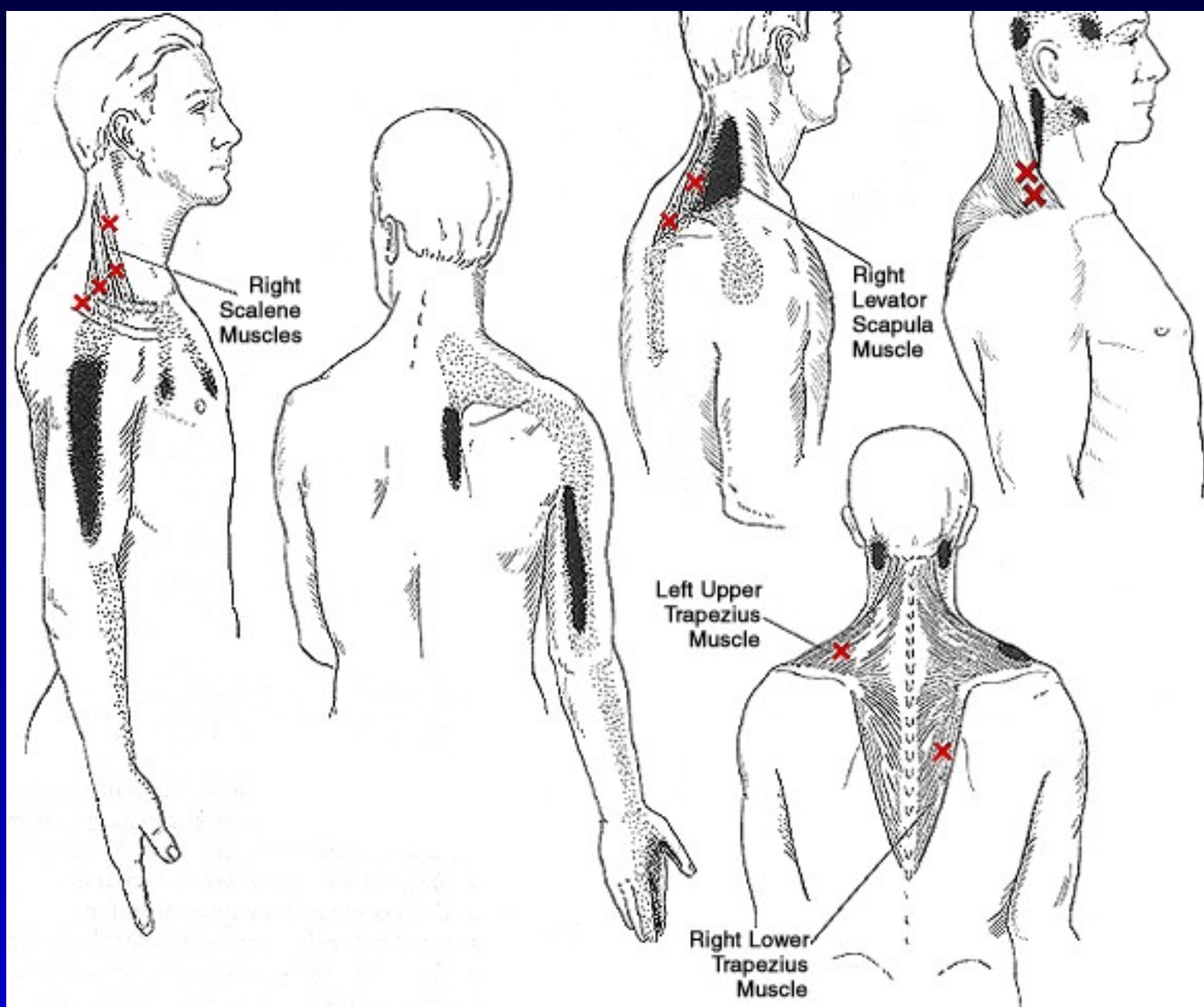
- **Acute vs. Chronic**
- **Identify pain generators**
 - mets, facet, disk, nerve
 - soft tissue (trigger points)
- **Identify objective measures**
 - deconditioning, inflexibility
 - weakness (neuropathic / disuse)
- **Pain behavior**
- **Altered pain perception**



Fibromyalgia vs. Myofascial Pain

- **Fibromyalgia**
 - Widespread pain > 3months (rt & lft, above & below waist, axial)
 - 11 of 18 tender points
 - Sleep disturbance & fatigue (alpha invasion of stage 3 & 4)
 - Neuroendocrine axis
- **Myofascial Pain**
 - local / regional
 - trigger points







Complex Regional Pain Syndrome (*CRPS*)

- **Poorly Understood**
 - sensitization of wide-dynamic range (WDR) neurons in dorsal horn., become activated by A fibers as well as C
- **No definitive test**
- **Kozin's Criteria**
 1. Pain
 2. Vasomotor instability
 3. Swelling

Complex Regional Pain Syndrome (*CRPS*)

- **CRPS I: “RSD”**
 - Sympathetic Independent
 - Sympathetic Maintained
 - Phentolamine challenge
 - Sympathetic block
- **CRPS II: “Causalgia”**
 - after nerve injury
- **Treatment**
 - Medications
 - Multidisciplinary Team
 - Early & Aggressive



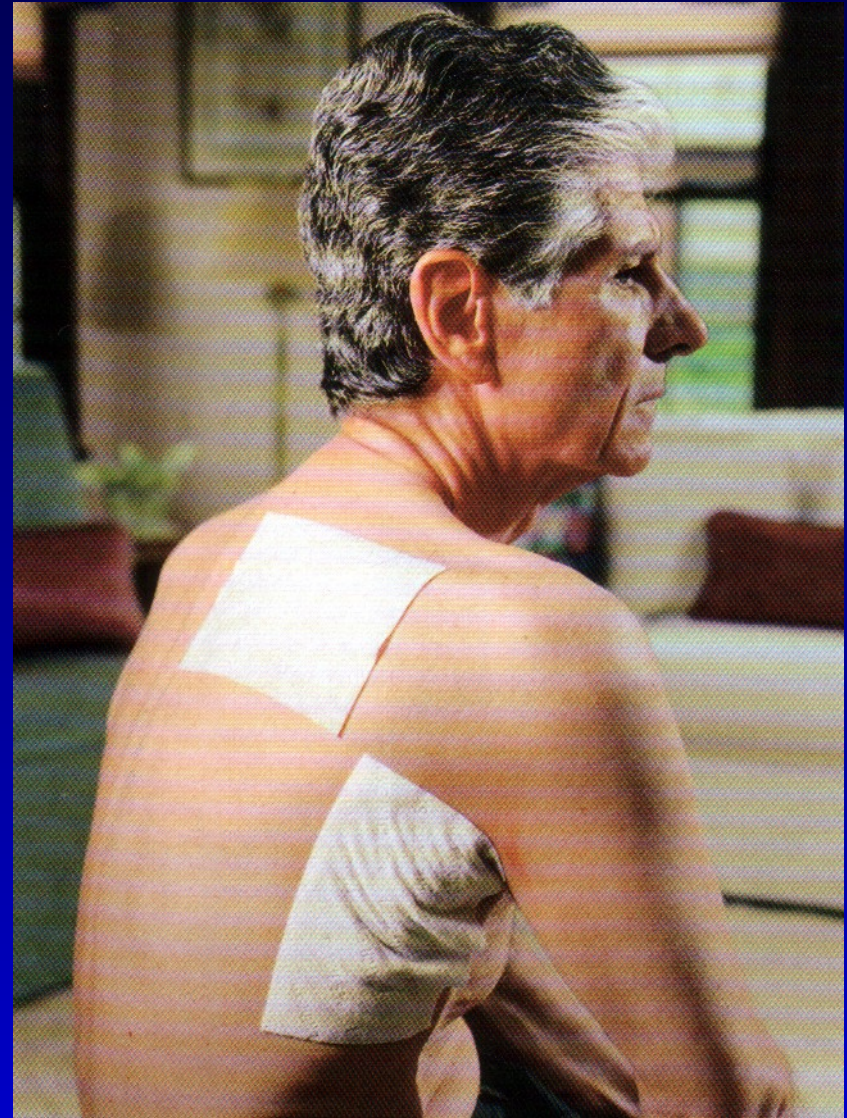
Post Herpetic Neuralgia

- **Not localized as skin lesion**
- **Pain lasting > 1 month after skin heals**
- **Increase incidence with age**
 - < 30 = no pain
 - age 40 = 33%
 - age 70 = 74%
- **No correlation to extent of involvement,**
 - may be related to immunocompromised state
- **Location:**
 - Thoracic Region (T5T6) 50%
 - Ophthalmic Division CN V 20%

Post Herpetic Neuralgia

Treatment:

- Antiviral agent < 72 hrs
(acyclovir, valacyclovir, famciclovir)
- Steroids < 1st week: helpful for reducing pain, unclear if decreases incidence of post-herpetic neuralgia
- Sympathetic/Nerve root blocks < 2 wks
- Topicals (Capsaicin, lidocaine)
- TCA's, Anticonvulsants
- TENS





Cancer Pain

- One of the greatest fears and source of morbidity
- Multidisciplinary approach
- NSAID's for bony pain
- No maximum recommended dose for opioids
- Start low and go slow
- Not all pain is cancer pain
- Multiple meds (adjuvants)

Treatment

Initial

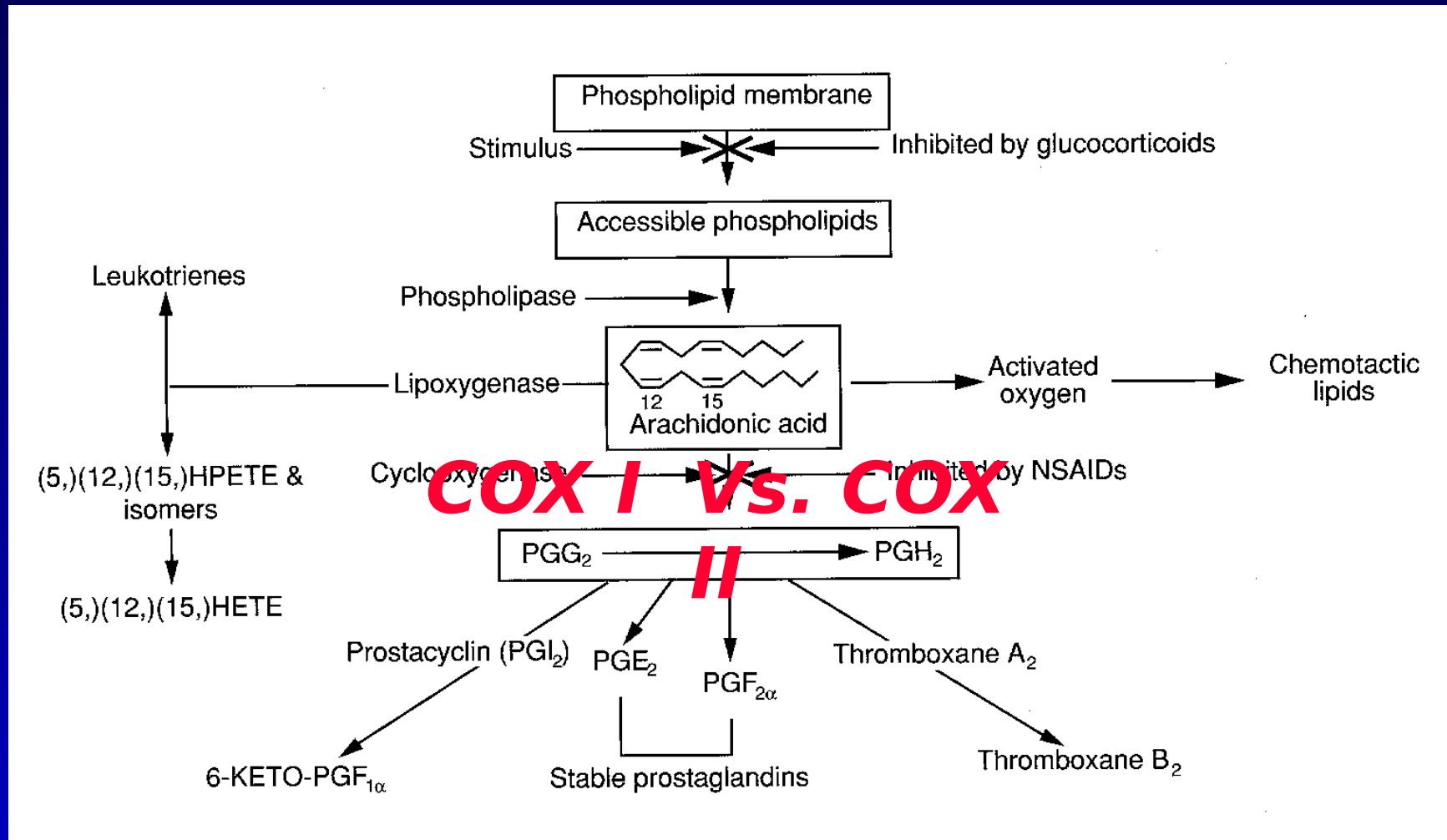
- **Initial Encounter**
 - build rapport, trust, decrease pain magnification
- **Appropriate Referrals / Studies**
 - Meet patient's needs
 - Labs, x-rays
 - Neurosurgery, Ortho, PM&R, Anesthesia Pain, Rheum
 - Psychiatry / Psychology (difficult during initial encounter)
 - Health improvement (smoking cessation, wt loss)
- **Patient Education**

Medications

- Acetaminophen
- NSAID's
- Topicals
- Corticosteroids
- Antidepressants
- Anticonvulsants
- Anti-arrhythmics
- Opioids



Arachidonic Acid Metabolism



Non-Steroidal Anti-Inflammatory Drugs (NSAID's)

<u>NSAID</u>	<u>Name</u>	<u>T 1/2</u>	<u>Peak Conc</u>	<u>Platelet Eff</u>
Naproxen	Naprosyn	13 hr	2-4 hr	
Ketorolac	Toradol	5.3 hr	0.3-1 hr	3-24 hr
Indomethacin	Indocin	4.5 hr	1-2 hr	24-48 hr
Tolmentin	Tolectin	2 hr	0.5-1 hr	8-16 hr
Ketoprofen	Orudus	1.7 hr	0.5-2 hr	4 days
Ibuprofen	Motrin	1.7 hr	1-2 hr	5-10 hr
Diclofenac	Voltaren	1.25 hr	1.5-2 hr	5-10 hr

Non-Steroidal Anti-Inflammatory Drugs (NSAID's)

<u>NSAID</u>	<u>Name</u>	<u>T 1/2</u>	<u>Peak Conc</u>	<u>Platelet Eff</u>
Oxaprozin	Daypro	58 hr	3-5 hr	21 days
Piroxicam	Feldene	38 hr	3-5 hr	7-20 days
Phenylbutazone	Azolid	72 hr	2 hr	7-20 days
Nabumetone	Relafen	20-30 hr	3 hr	no sig effect
Sulindac	Clinoril	16 hr	2-4 hr	4 days
Diflunisal	Dolobid	15 hr	2.3 hr	
Non acetylated salicilates (Trilisate, Disalcid)				No effect

Non-Steroidal Anti-Inflammatory Drugs (NSAID's)

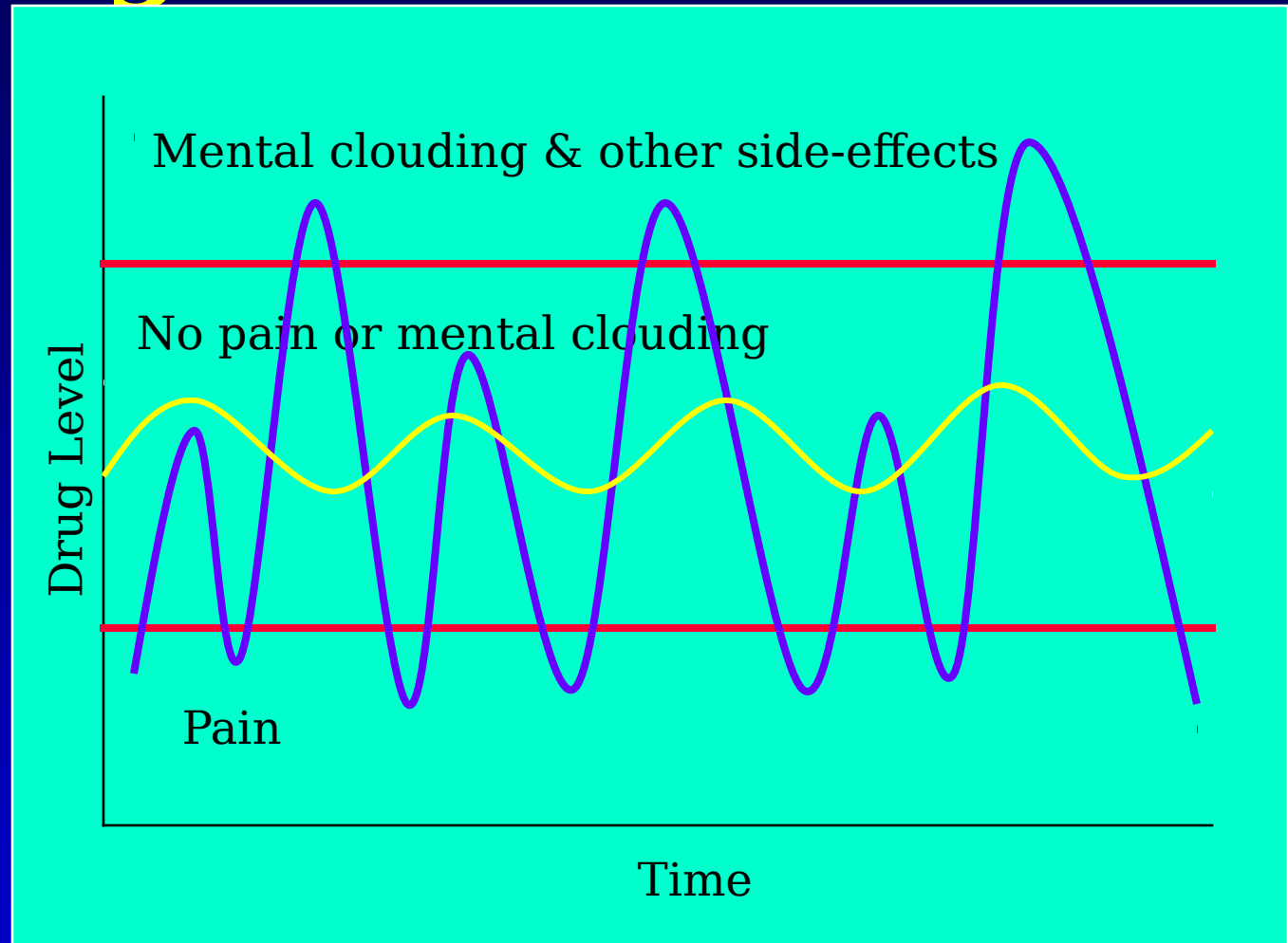
- Rofecoxib (Vioxx) 12.5, 25, 50mg
- Celecoxib (Celebrex) 100, 200mg
- Valdecoxib (Bextra) 10, 20mg

Opioids

Generic Name	Trade Name	Oral Dose	Parenteral
Codeine		30mg q 3-4 h	10mg q 3-4 h
Hydrocodone	Vicodin, Lorcet	10mg q 3-4 h	N/A
Hydromorphone	Dilaudid	7.5mg q 3-4 h	1.5mg q 3-4 h
Meperidine	Demerol	300mg q 2-3h	100mg q 3h
Morphine		30mg q 3-4h	10mg q 3-4h
Morphine	MSC Contin	15mg q 3-4h	N/A

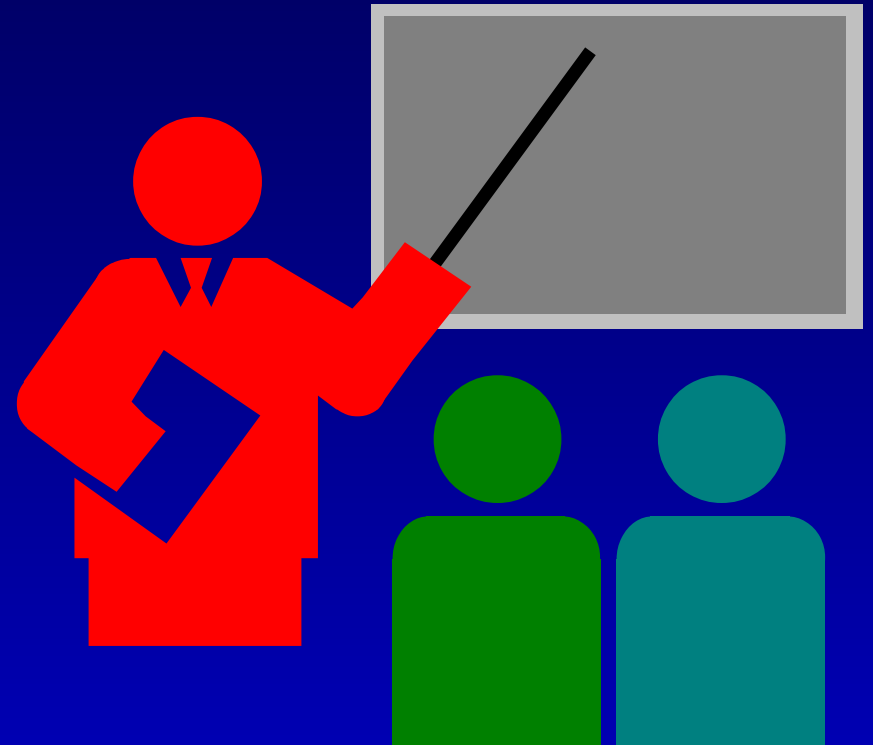
Opioid - Long Acting Malignant vs. Non- malignant Pain

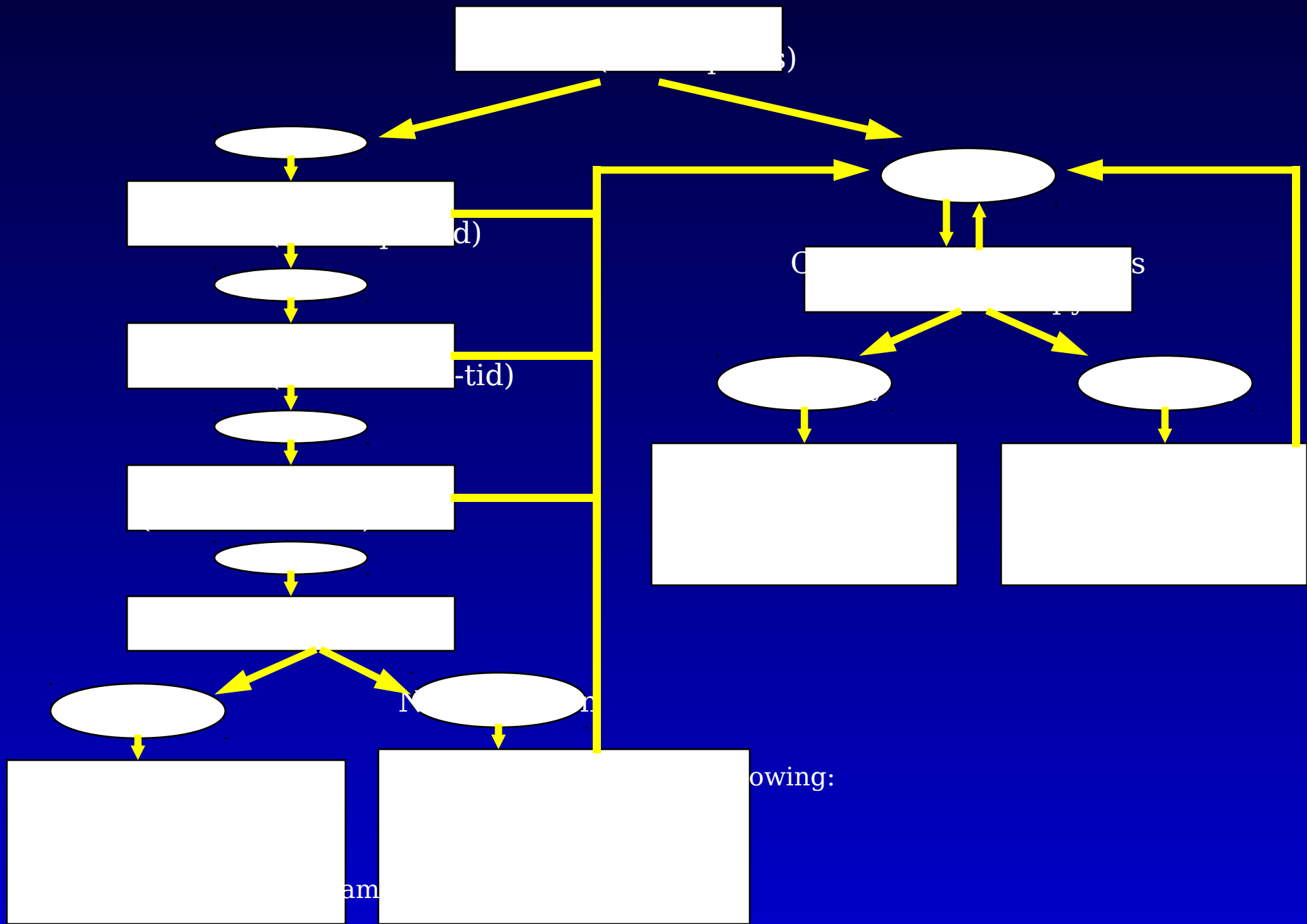
- **MS Contin**
- **Oxycontin**
- **Duragesic**
- **Methadone**



Opiod - *Side Effects*

- **Meperidine (Demerol)**
 - Toxic metabolite cerebral irritant (irritability, tremors, convulsions)
 - Excreted through kidneys
 $t_{1/2}$ 15-20 hrs
- **Respiratory depression**
- **Sedation**
- **Confusion**
- **Nausea**
- **Addiction**
- **Constipation**





Antidepressants

- TCA's > SSRI
- Efficacy is independent of antidepressant effect
- Re-uptake inhibitors of norepinephrine and serotonin
- Side Effects
 - Sedation
 - Dry mouth, urinary retention, visual changes, orthostasis
 - Wt gain
- Agitation in some patients

<u>Drug</u>	<u>Dose</u> <u>(mg)</u>	<u>Comments</u>
Amitriptyline	10-200	Most frequent
Nortriptyline	10-200	Less anticholinergic
Imipramine	10-200	
Desipramine	10-200	
Doxepin	10-200	Most sedating
Trazodone	50-300	Fewest cardiac

Anticonvulsants

- Most effective in lancinating neuropathic
- Membrane stabilizing effect
- May be synergistic with antidepressants

Drug	Dose (mg)	Comments
Carbamazepine (tegretol)	200 q 6-8 hrs	Best studied
Phenytoin (dilantin)	100-200 tid (sustained release available)	Less anticholinergic
Gabapentin (neurontin)	100-1200 tid	Fewest side effects
Valproic Acid	250-500 tid	Least sedating
Topamax (topiramate)	25-200 bid	Renal impairment
Trileptal (Oxcarbazepine)	300-1g bid	Renal impairment
Topamax (topiramate)	25-200 bid	St

Medications - *Other*

- **Adrenergic Agonists**

- *Clonidine*

- sympathetically maintained
pain available in patch form

- **Oral Anesthetics**

- *Mexiletine*

- oral lidocaine equivalent
neuropathic pain decrease
Na

- influx, decrease conduction
potential cardiac clearance

- **Benzodiazepines**

- primarily for anxiety not
pain

- **Benzo/Opioid like**

- *Tramadol*

- acts on mu opiate receptors
mild serotonin re-uptake
inhibitor

- **Topicals**

- *Capsaicin / Zostrix*

- decreases substance P

- *Lidoderm patch*

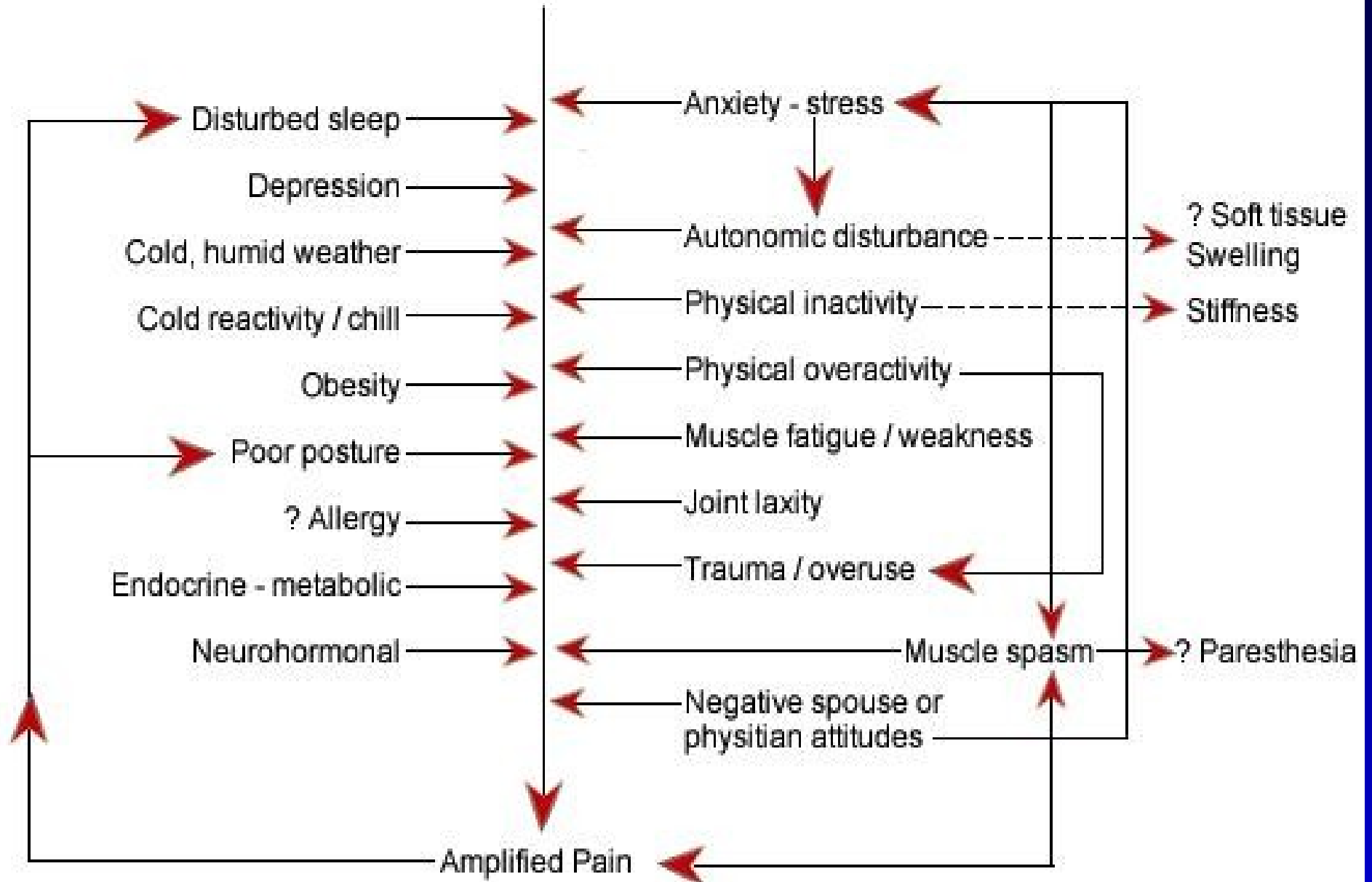
Medications - *Other*

- NMDA Receptor Antagonist
 - Dextromethorphan
 - Ketamine
 - Methadone
- Anti-spastic
 - Zanaflex (2-4 mg po qhs)
 - Baclofen (Lioresal: 5mg qhs-tid)
- Botulinum Toxin
 - Botox
- Gabitril (Tiagabine)
 - GABA reuptake inhib
 - 2-8mg qhs

Behavioral Management

- Reinforce well behaviors
- Don't reinforce pain behavior
- Identify and modify contributing factors...

PROBABLE CONTRIBUTING FACTORS



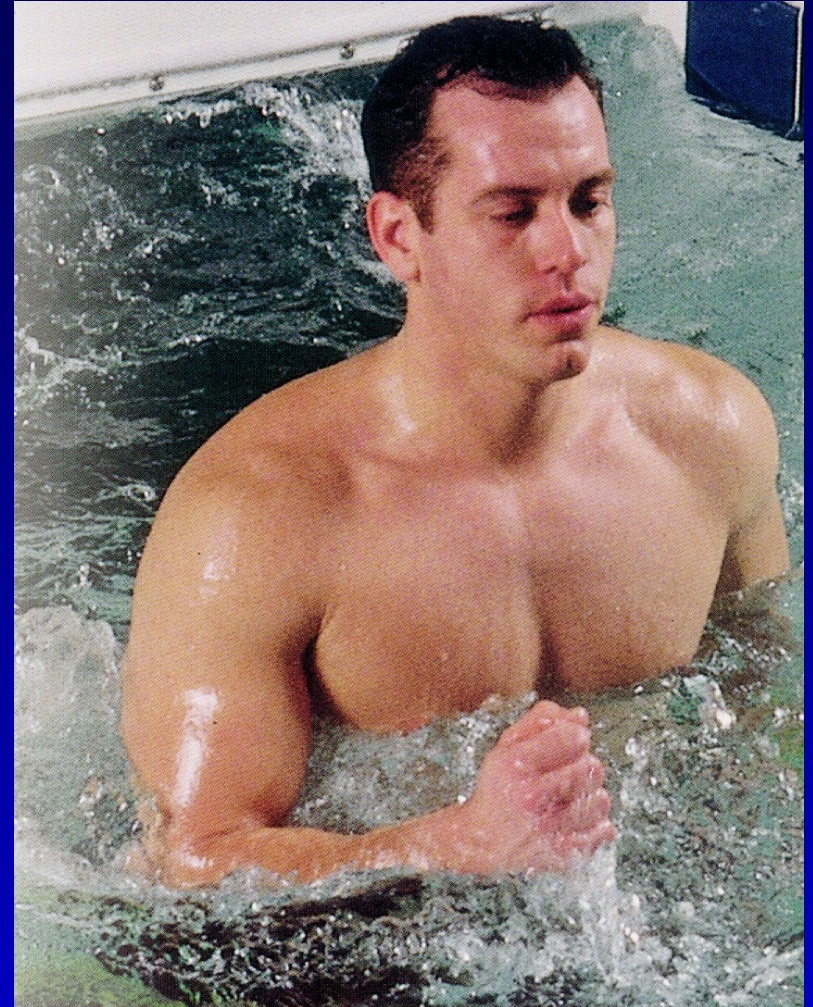
Therapy

- **Physical Therapy**
 - muscle imbalance
 - strengthening, stretching
 - aerobic conditioning
 - pool exercises
- **Occupational Therapy**
 - ADL's
 - Ergonomics, work eval
 - desensitization



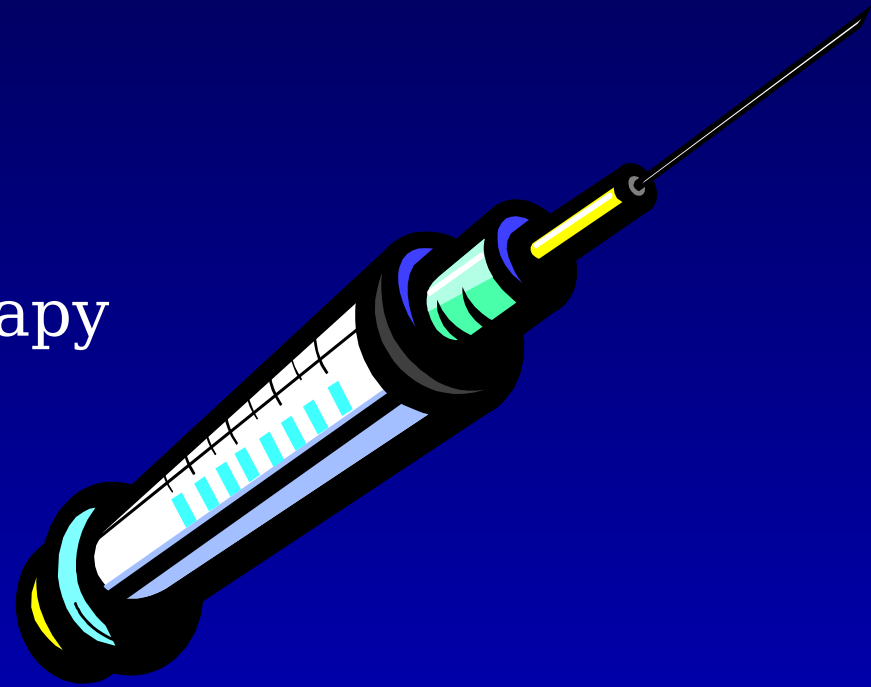
Modalities

- **Heat**
 - hot packs, ultrasound, paraffin
 - bath & shower
- **Ice**
 - massage, packs (peas & corn)
- **Electrical Stimulation**
 - Therapy
 - TENS
- **Contrast Baths**



Invasive Procedures

- **Joint/Trigger Point Injections**
 - diagnostic
 - therapeutic (break pain cycle)
 - may allow participation in therapy
- **Epidural Steroids**
- **Sympathetic Blocks**
- **Facet & Radiofrequency Ablation**
- **IDET**



Epidural Steroid Injections

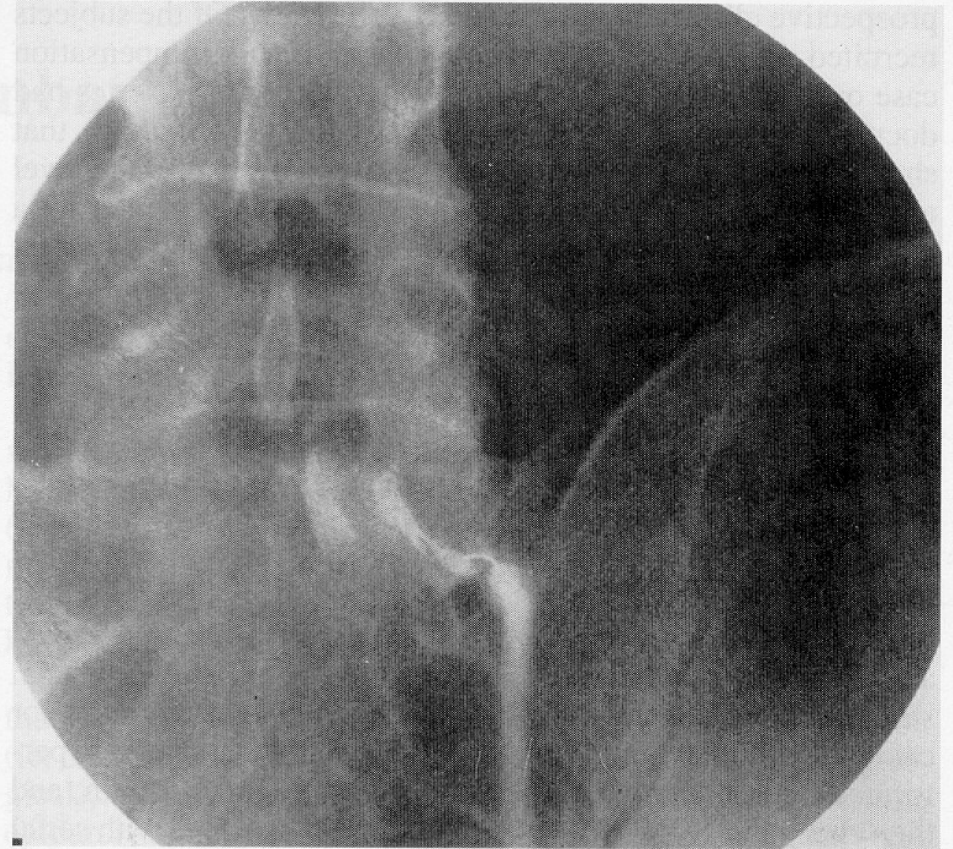


Fig 3. Example of an S1 transforaminal epidural injection on the anterior-posterior fluoroscopic projection demonstrating contrast outlining the right S1 nerve roots.

IDET

